

ABSTRACTS

LBORC-NUFA Poster Abstracts 2022: Residents

Every year at the American Academy of Osteopathy Convocation, the Louisa Burns Osteopathic Research Committee (LBORC) and the National Undergraduate Fellows Association (NUFA) together host a research poster presentation session for residents and medical students. The 2022 poster abstracts for residents are presented here.

CASE STUDY

Aziza Bomani-Bailey, DO, PGY2; Tongbo Xu, OMS II; Hugh Ettlinger, DO, FAAO

Response to Osteopathic Manipulative Treatment in a Patient with Amyotrophic Lateral Sclerosis: A Case Report

Introduction/Background: Amyotrophic Lateral Sclerosis (ALS), the most common form of acquired motor neuron disease, is characterized by insidiously progressive neurodegeneration of motor neurons. There is currently no cure. Treatment is focused on symptomatic management and end-of-life comfort care. Dysphagia is a major disease complication and can lead to death by asphyxiation, aspiration pneumonia, nutrient deficiency, or dehydration. One pilot study has found potential benefit of using Osteopathic Manipulative Treatment (OMT) in ALS, but results were inconclusive due to small sample size.

Case: WG, a 72M with medical history of atrial fibrillation and newly diagnosed ALS (with symptoms starting 5-10 years ago), presented to outpatient OMT clinic at NYITCOM. He is a newly retired critical care physician, retiring due to worsening, debilitating, full-body pain (worse in lower extremities), headaches, weakness, altered gait and dysphagia. He was prescribed a Combivent inhaler for daily tussive episodes following aspiration of food or water. Osteopathic Structural Exam (OSE) was notable for restrictions in the atlanto-occipital joint, hyoid bone, sacral base, and diaphragm. OMT was performed with Osteopathic Cranial Manipulative Medicine, Myofascial release and Balanced Ligamentous Tension.

Results: After 10 OMT visits, patient had observable improvements in OSE. He reported significant symptomatic relief, including decreased dysphagia and Combivent use. Headaches and lower extremity pain were decreased in frequency and intensity, allowing him to wear socks and pants again after two years.

Discussion: OMT was safely used in this patient, showing significant improvements in dysphagia, pain, OSE and quality of life (QOL). Use of OMT in ALS patients to reduce dysphagia is a compelling area of research to explore, as reducing dysphagia can increase QOL and lifespan in this patient population.

Frank Goodman, DO, MS; Rachel Ammons, OMS III; Garren Gebhardt, DO; Janell Largent, DO

An Osteopathic Approach to Secondary Enuresis and Encopresis: Recovering Autonomic Stability

Introduction/Background: Anticipated bladder control at night is expected by five years of age. If intermittent urinary incontinence while asleep continues, at least two times per week for three months, it is then classified as enuresis. This burden is experienced by an estimated 6 million children in the United States. The pathophysiology of enuresis is multifactorial, though an underlying component is believed to be consistently contributory: autonomic instability. The L1-L3 sympathetic storage reflex and the sacral plexus parasympathetic voiding reflex must function properly for daily continence. Encopresis is defined as involuntary bowel movements in inappropriate places at least once a month for three months or more in children four years and older.

Case: M, a nonverbal 8-year-old male with Down's

syndrome, presented to osteopathic manipulative medicine clinic with secondary enuresis and encopresis. It was hypothesized that the COVID-19 pandemic complicated by school closure had disorganized the patient's learned voiding schedule. The primary goal of this case was to re-establish continence with utilization of osteopathic techniques focused on optimizing spinal mechanics and autonomic function while utilizing the biomechanical, neurologic, metabolic, and psychosocial osteopathic models of treatment. Techniques consisted of V-Spread, Sub-occipital Inhibition, Rib FPR, Sacral Ligamentous BLT, and Ischiorectal Fossa Release.

Results: M had a large bowel movement following recent visits, and with reduced incidence of nocturnal enuresis and encopresis with increased daytime toileting.

Discussion: The findings from our case study support other low-level evidence that OMT can be useful in the management of enuresis and encopresis, by possibly moderating autonomic function and would recommend further follow-up with a prospective study. Limitations were complicated by social determinants of health; primary parent, multiple long car-rides, confounded by re-starting school schedule with previous routine.

Zachary Harris, DO, PGY3; Hugh Ettlinger, DO, FAAO

The Successful Use of Osteopathic Manipulative Treatment (OMT) for Positional Plagiocephaly: Now He's an Ambi-turner!

Introduction: Positional plagiocephaly (PP) is a common condition of cranial asymmetry that typically occurs in infants, resulting from mechanical factors applied over a period of time in utero, at birth, or postnatally. PP is often associated with congenital muscular torticollis (CMT). This case builds on current research and exemplifies that OMT offers an effective, non-invasive treatment option for cranial asymmetries associated with PP and CMT.

Case: JD is a 5-month-old male who presented to OMT clinic after pediatrician referral for plagiocephaly. Head asymmetry and rotation preference were first noted around 3 months of age. Initial exam was notable for head asymmetry with left-sided occipital/parietal flattening, left head rotation preference, and accompanying osteopathic structural findings. Trial of OMT was initiated aimed at decreasing somatic dysfunction, improving inherent motion of cranial vault, and reducing rotational

restriction.

Results: JD was evaluated and treated with OMT weekly or bi-weekly for total of 9 visits with gradual improvement noted by parents and on exam. By ninth visit, left head rotation preference had resolved, cervical range of motion was full, parallelogram-shaped plagiocephaly was markedly improved with only mild asymmetry remaining, and somatic dysfunctions were significantly improved.

Discussion: PP is an example of an adaptive deformity associated with CMT that can lead to a permanent conformation and several areas of developmental delay. Craniofacial deformities and facial asymmetry may persist in older children and adults, potentially leading to stigmatization, impaired psychological development, poorer academic performance, and corrective surgery. Our case highlights the impact OMT can have on a common pediatric condition with potential for serious adverse outcomes. This case is limited by absence of objective asymmetry measurements, which further studies could benefit from.

Chelsea Masterson, DO, ONMM3, PGY4; Audrey Byrd, OMS III; Garren Gebhardt, DO

SCIWORA: A Pediatric Case

Introduction/background: Children possess a plasticity that makes spinal cord injuries rare. The anomaly Spinal Cord Injury Without Radiographic Abnormality (SCIWORA) proves particularly difficult to treat because of the lack of radiological evidence for targeted therapies. It is estimated that 6-19% of spinal cord injuries in pediatric populations are true SCIWORA cases. SCIWORA remains underdiagnosed and undertreated.

Case: 15-year-old Patient K survived a water sporting accident that left her with both somatic and autonomic deficits without corroborating radiographic evidence. Symptoms included: lost eyesight, headache, lost bladder control, decreased sensation and motor control of the right side of her body, severe mood lability, photophobia, and inability to concentrate. Patient K's recovery became focused on functional rehabilitation including Osteopathic Manipulative Treatment (OMT) in which indirect unwinding of myofascial restrictions with sutural cranial manipulation was used.

Results: After six 1-hour appointments over the course of 2.5 months, Patient K became pain-free with full

strength in all extremities, decreased frequency of mood swings, decreased frequency and severity of headaches, and increased ability to walk long distances and run short distances with only mild abnormalities in gait. She no longer had autonomic instability or bladder incontinence.

Discussion: Patient K progressed from not being able to do daily activities to going back to school after her OMT treatments. Her SCIWORA symptoms were thought to be due to diffuse microscopic shearing of cerebral and spinal vessels. OMT is documented as an effective treatment for neuropathic pain associated with spinal cord injury, but little research has been done in regard to structural and functional healing with manipulative therapies. More cases using OMT as treatment for SCIWORA are needed.

Xiawei Zhong, DO, PGY3; Varna Davalath, DO, PGY3; Arlene O'Donnell, DO

Healing from trauma – Effect of platelet-rich plasma on post-traumatic neck injury resulting in muscle spasm

Introduction: Chronic neck pain is the second most frequent musculoskeletal complaint in the US. Conventional treatments are often symptom driven. Platelet-rich plasma (PRP) injections target core ligamentous injury to stabilize joints. This case depicts using PRP to heal chronic neck pain.

Case: A man in his 40s presented for chronic neck pain following physical assault five years prior. His June 2020 MRI showed anterolisthesis of C5-C6, disc degeneration and bulging, arthritis changes of spinous processes C3-C6, and cervical lordotic curve flattening. Damage caused profound right-sided paraspinal muscle spasm; non-radicular, sharp right-sided neck pain worsening with left head rotation. Subjective pain rated 6/10, notably associated with headaches and bilateral tinnitus. PT, TENS, acupuncture, massage, rhizotomy, and Botox therapies were ineffective. PE revealed a negative Spurling test, C4-C6 right muscular spasm, and decreased cervical lordosis. Prolotherapy was completed one week later to the supraspinous and interspinous ligament attachments of C3-C7 resulted in significant but short-lasting improvement. Three PRP rounds were performed to these same ligaments of C3-T1. On the last round, right C4-C5 facet joint, splenius capitus, and semispinalis capitus attachments to the occiput were also injected.

Results: After the second PRP, the patient's baseline

pain decreased to 1/10, initiated now-effective PT, with minimal headaches, decreased cervical muscle spasms, improved neck mobility, and greater receptiveness to trauma psychology counseling. After the third and last PRP, the patient was told to self-assess for possible additional treatment 3 months later, which he declined due to significant gains already achieved.

Discussion: This case illustrates the benefits of PRP for chronic and/or refractory disease when all other treatment options have been exhausted. Study limitation: no post-treatment neck MRI comparing objective findings.

Brian L. Zylinski, DO, PGY4; Chelsy M. Stephenson, DO, PGY4; Amy L. Dean, DO; John W. Rajala, DO, PGY2; Dustin J. Miller, MD

Osteopathic Manipulative Treatment plus Phototherapy in the Management of Neonatal Hyperbilirubinemia: A Case Report

Introduction/Background: Neonatal hyperbilirubinemia (NH) has complications and is costly. Current standard of care for NH is phototherapy. Osteopathic manipulative treatment (OMT) has been shown to be safe and effective in other neonatal and infantile conditions. There is little literature on OMT and NH, although some studies have shown that massage therapy can be used safely and effectively in NH. We show a patient with NH treated with OMT plus phototherapy, which resulted in rapidly lowered bilirubin. Patient was discharged much sooner than the average reported length of stay (LOS) for NH managed with phototherapy alone according to current literature.

Case: Patient was a 4-day-old term female readmitted for NH. Osteopathic structural exam: head: cranial base compression, bilateral occipitomastoid membranous articular strain, right condylar compression (treatment: osteopathic cranial manipulative medicine), cervical: OA right facet restriction, C6-7 restriction (treatment: myofascial release/MFR), sacrum: S1-3 compression (treatment: MFR), innominate: right intraosseous compression (treatment: MFR), upper extremity: right clavicle restriction, left scapulothoracic restriction (treatment: MFR), and abdomen: bilateral hemidiaphragm restriction (treatment: MFR), liver capsular restriction (treatment: visceral manipulation).

Results: Patient's bilirubin dropped rapidly following OMT. Average LOS for NH managed with phototherapy alone = 45.97 hours. Patient's LOS = 24.90 hours.

No adverse events were reported as a result of OMT.

Discussion: We show a case of NH managed with OMT plus phototherapy rapidly lowering bilirubin and resulting in a much sooner-than-anticipated discharge than if patient's NH was managed with phototherapy alone. Hence, OMT plus phototherapy may be superior to phototherapy alone for management of NH. However, this study is limited because $n = 1$. Hence, more research is needed, such as a small pilot study eventually leading to randomized controlled trials.

EDUCATION AND PUBLIC HEALTH

Madiha Huq, DO, PGY4; Phuong Daniels DPT, OMS IV; Shan Shan Wu, DO; Devi Jhaveri, DO; Robert Hostoffer, DO

Development of Osteopathic Rhinitis Module in an Allergy/Immunology Fellowship

Background: The whole-body approach is the cornerstone of osteopathic medicine. The application of this principle in osteopathic manipulation comes natural to the primary care setting. With a focused subspecialty such as allergy/immunology, our fellowship has sought to define a more focused osteopathic patient appraisal and treatment.

Objective: We strive to improve the quality of our fellowship osteopathic training with a development of an osteopathic manipulation program with an allergy/immunology focus.

Methods: We designed an osteopathic manipulation module focusing on relieving rhinitis symptoms. We redesigned a treatment room into a procedure room with an addition of a manipulation table. Patients who presented with rhinitis symptoms were offered osteopathic manipulative treatment (OMT). Following the completion of OMT, the patients were provided with a handout and detailed instructions on how to perform self-treatment techniques at home.

Results: The patients who chose to receive OMT appreciated a holistic treatment approach to their symptoms. Most of our patients reported some symptom relief post-treatment and were willing to learn about self-treatment techniques.

There was a designated fellow assigned to perform OMT in the out-patient clinic during research or consult blocks.

This way, our fellows would have additional exposure to clinical application of OMT that is pertinent to the allergy/immunology osteopathic recognition subspecialty.

Discussion/Conclusion: Performing OMT on patients with rhinitis presents an additional opportunity to apply osteopathic principles in a subspecialty setting. This osteopathic rhinitis module will not only enhance the osteopathic quality of our fellowship training, but it will also emphasize a structural/functional approach to patient care.

Starr Matsushita, DO, PGY3; Erin Lee, DO, PGY3; Olivia Pipitone, MPH; Amber Vester, DO

The effect of longitudinal osteopathic experiences on family medicine resident confidence and utilization of osteopathic manipulative treatment

Introduction/Background: Family Medicine (FM) residents receive varying degrees of osteopathic manipulative treatment (OMT) training. Our FM residency program implemented a new Osteopathic Recognition curriculum. Residents self-selected into an OMT tier, which dictated their involvement in OMT curriculum: Foundational (FT, least), Integrated (IT), or Osteopathic (OT, most).

Objectives: We sought to measure the impact of the new OR curriculum on resident OMT utilization and resident competency, confidence, and efficiency in OMT treatment.

Methods: For IT and OT residents, we tracked the number of OMT visits performed six months pre and post curriculum implementation. Residents were surveyed pre and post, to assess OMT competency, confidence, and efficiency. Two FM faculty members completed similar pre and post surveys of IT and OT residents.

Results: The average number of OMT visits per OT resident increased from 8 to 20 visits but decreased for IT residents from 16 to 8 visits. The percent of OT resident visits with OMT increased from 7% to 11% but decreased for IT residents from 7% to 3%. Resident self-assessment surveys showed no significant change in OMT competence or confidence (all $p > 0.05$ from McNemar's tests), however, faculty noted improvement in resident performance in all surveyed categories. The largest improvements were "Confident patient communication/education" (Pearson's Chi-squared $p = 0.02$), "Efficient osteopathic charting and billing" ($p = 0.03$), and "Efficient

osteopathic charting and billing” ($p=0.05$).

Discussion/Conclusion: OT residents completed more OMT encounters after curriculum implementation, indicating that commitment to the most rigorous track gave more opportunity to apply OMT skills. Faculty noted resident improvement in several important areas, but residents did not perceive the same improvement. More research is needed to evaluate the impact of OMT curriculum in FM residencies.

ORIGINAL RESEARCH

Tiffany Crider, DO, MPH, PGY5; Jared Grimm, OMS III; Al Kozar, DO, FAOASM, R-MSK; A. Hope Tobey, DO, FAAP, FACOP

Variations in Average Cranial Rhythmic Impulse Rates

Introduction/Background: Majority of the studies on cranial rhythmic impulse (CRI) have been completed on healthy adults. Few of these included variables which may affect rate. Identifying how different variables effect the average CRI rate can help physicians understand how variances in CRI relate to patients.

Objective: The main objective is to determine if there are differences in the average CRI rate based on age. A secondary objective is to evaluate variables including sex, diagnoses, state of the patient, before treatment, and after treatment for change in rate.

Methods: A retrospective chart review was performed from 8/1/2021-1/31/2022 by querying head somatic dysfunction, then further reviewed for office visit and osteopathic manipulative treatment (OMT) resulting in 155 unique patients over 227 encounters. The CRI along with the variables noted above were abstracted and analyzed using mean, median, mode, range, standard deviation, t-test, ANOVA, and Tukey HSD when appropriate.

Lenz, Table 1. Results

Year	2015	2016	2017	2018	2019	2020	2021
CPT Codes: 98925-29	13,344	13,785	14,803	16,681	12,423	8,925	9,791
ICD-10 Codes: MM99.00-99.09	4,705	24,028	27,121	31,862	29,686	21,049	22,931
Referrals	568	488	398	528	599	455	526

Results: The difference between the average CRI rate for newborn-8 years old(yo), 9yo-59yo, and 60yo and older was significant. The rates were 16.7, 11.7, and 10.6 respectively (p -value <0.01 , $n=219$). Also, the average CRI rate increased by +0.8 after treatment (p -value <0.01 , $n=177$).

Discussion/Conclusion: Children less than 8yo have faster average CRI rates, while adults over 60 have slower rates, proving age affects CRI rate. OMT increased the CRI rate providing numerical evidence of an immediate change. Physicians can use this to improve patient health and evaluate treatment in real time. A prospective study could confirm these findings and analyze patient reported changes. Study limitations include available documentation and limited sample size of certain age groups.

Alecia Lentz, DO, PGY2; Nicole Fremarek, DO, MBA, PGY3; Garrett Caldwell, DO

What was the impact of SARS-CoV-2 pandemic on the use and referral patterns of Osteopathic Manipulative Medicine (OMM): a retrospective study

Introduction/Background: The SARS-CoV-2 global pandemic has left an impact on society and medicine through an increased sedentary lifestyle, access to personal protective equipment (PPE), and a decline in patient contact. This, in combination with a known diminished use of OMM amongst providers throughout the country posed concern for worsening decline of OMM use after the pandemic.

Objective: To determine the impact of the SARS-CoV-2 pandemic on the use of OMM in the outpatient setting and changes in referral patterns to an OMM specialists.

Methods: Utilizing the UMHW EHR, a hospital founded by osteopathic physicians with a strong foundation of osteopathic principles and practice, data was queried from the top 100 locations within the UMHW system from 1/1/2015 to 12/31/2021 for use of: five OMM

CPT codes, ten OMM ICD-10 codes, and orders placed for “referral to OMM.” Exclusion For CPT and ICD-10 codes use included inpatient hospital use and the UMHW OMM Clinic.

Results: There was a decrease in use of CPT, ICD-10, and referrals placed between quarter 1 and quarter 2 of 2020 with a gradual increase, but not to the same extent as years prior (Table 1).

Susanne Murphy, DO, PGY3; Anna Mercer, DO, PGY2; Hugh Ettlinger, DO, FAAO

Nurturing the Breath of Life: A Retrospective Analysis of the Effect of Osteopathic Manipulative Treatment on Patients Ventilated for COVID-19

Introduction/Background: COVID-19 has killed more than 864,000 individuals in the US, with few effective treatments. There is currently no published research on the use of osteopathic manipulative treatment (OMT) on patients ventilated due to COVID-19.

Objective: The researchers hypothesize that patients treated with OMT have improved outcomes compared to those who are not.

Methods: This study includes all patients with COVID-19 who were treated with OMT at Saint Barnabas Hospital (SBH) between 3/30/20 and 4/20/20 and had been mechanically ventilated during their hospital stay. All patients received an OMT consult; some were already intubated, while others were intubated subsequent to the initiation of OMT. These patients were treated by a member of the osteopathic manipulative medicine (OMM) team using articulatory, lymphatic, and balancing techniques five times per week until discharge. Their data were compared to all patients at SBH who were admitted for COVID-19 pneumonia and required ventilation during the same time period. Data were gathered retrospectively through chart review and analyzed by percent survival.

Results: At SBH, the overall survival rate of patients ventilated for COVID-19 pneumonia early in the pandemic was 23%. Patients treated by the OMM team had a survival rate of 50%.

Discussion/conclusion: This study provides outcomes of patients treated with OMM who required mechanical ventilation. These data suggest patients who were treated with OMT while ventilated may have decreased mortality. Patients were found to have similar, severe somatic

dysfunctions most notable in the thorax and cranium. Limitations of this study include a small sample size and non-random sample selection; further prospective research with a larger sample size and randomized participation versus control would be necessary to make any definitive conclusion.

Chelsy Stephenson, DO, PGY4; Nicole Fremarek, DO, PGY3; Alecia Lentz, DO, PGY2; Alaina Klene-Bowns, DO, MPH; Matthew Boeve, DO; Kelley Brinsky, DO; Lucan Chatterley, DO; Caesy Yarling, DO; Garrett Caldwell, DO; Darren Grunwaldt, DO

A Randomized Pilot Study Comparing Bilirubin Levels of Newborns Treated with Osteopathic Manipulative Treatment (OMT) Versus Routine Newborn Care Alone

Introduction: Bilirubin naturally increases after birth and can be influenced by stooling and feeding patterns. If bilirubin is moderately elevated, it can lead to jaundice or even rehospitalization. OMT has been demonstrated to affect stooling and feeding positively.

Objective: To investigate if OMT performed in the immediate newborn period will decrease the elevation in bilirubin levels.

Methods: Term newborns younger than 12 hours were recruited from June 2017- January 2021. Exclusion criteria included observation in special care nursery, phototherapy (endpoint), or consultation for OMM. Once enrolled the newborn is randomly assorted into the OMT group or No OMT group. Initial transcutaneous bilirubin (Tcb) was measured followed by systematic screening of somatic dysfunction in 9 regions: Cranium/OA, mouth/pterygoid/palate, cervical spine, CT Junction/T1-T4, Low thoracic/ribs/diaphragm, Lumbar/sacrum, abdomen, pelvis, and other. Participants continued with routine newborn care. Tcb levels were measured for all newborns at 24-28 hours. Chart review was utilized for endpoints. Student T-test with two sample unequal variance was used for data comparison in Excel.

Results: 50 newborns were recruited. Average number of regions with presence of somatic dysfunction was 5.58 out of 9. All 50 newborns had somatic dysfunction in the Cranium/OA. 8 newborns were excluded for bilirubin analysis. There was no statistically significant difference in the change of bilirubin between initial and the 24-28

hour measurements when comparing newborns in the OMT group to the newborns in the No OMT group; $t(40)=0.4$, $p=0.35$.

Conclusions: OMT did not significantly affect the bilirubin level versus routine newborn care alone. There

was a trend to find somatic dysfunction in the cranium/OA. Small sample size was a limitation to this study and recommend modified recruitment in future studies of OMT and bilirubin levels. ■